

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference 2/W40028WO	<b>FOR FURTHER ACTION</b>	See item 4 below
International application No. PCT/GB2004/003204	International filing date ( <i>day/month/year</i> ) 23 July 2004 (23.07.2004)	Priority date ( <i>day/month/year</i> ) 04 August 2003 (04.08.2003)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant PALL CORPORATION		

1.	This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).																								
2.	This REPORT consists of a total of 7 sheets, including this cover sheet.  In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.																								
3.	<p>This report contains indications relating to the following items:</p> <table style="width: 100%;"> <tr> <td style="width: 10%; text-align: center;"><input checked="" type="checkbox"/></td> <td style="width: 30%;">Box No. I</td> <td style="width: 60%;">Basis of the report</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>	<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input checked="" type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input checked="" type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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4.	The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).																								

<p style="text-align: center;">The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No. +41 22 740 14 35</p>	<p>Date of issuance of this report 06 February 2006 (06.02.2006)</p> <p>Authorized officer  Dorothee Mülhausen</p> <p>Telephone No. +41 22 338 87 40</p>
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# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:       <div style="text-align: center;">see form PCT/ISA/220</div>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>RECEIVED</b>  <b>13 OCT 2004</b> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>WIPO      PCT</b> </div> <div style="text-align: center; font-size: 2em; font-weight: bold; margin-top: 10px;">PCT</div> <div style="text-align: center; margin-top: 10px;"> <b>WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY</b>            (PCT Rule 43<i>bis</i>.1)         </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">           Date of mailing            (day/month/year) see form PCT/ISA/210 (second sheet)         </div>	
Applicant's or agent's file reference see form PCT/ISA/220	<b>FOR FURTHER ACTION</b> See paragraph 2 below	
International application No. PCT/GB2004/003204	International filing date (day/month/year) 23.07.2004	Priority date (day/month/year) 04.08.2003
International Patent Classification (IPC) or both national classification and IPC B01D45/16, B04C3/04, F02M35/022		
Applicant PALL CORPORATION		

1. This opinion contains indications relating to the following items:

- ☒ Box No. I      Basis of the opinion
- ☒ Box No. II      Priority
- ☐ Box No. III      Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV      Lack of unity of invention
- ☒ Box No. V      Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI      Certain documents cited
- ☒ Box No. VII      Certain defects in the international application
- ☐ Box No. VIII      Certain observations on the international application



**2. FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:  <div style="text-align: center;">  </div> <div style="margin-top: 5px;">             European Patent Office              D-80298 Munich              Tel. +49 89 2399 - 0 Tx: 523656 epmu d              Fax: +49 89 2399 - 4465           </div>	Authorized Officer  <div style="text-align: center;">  </div> <div style="margin-top: 10px;">             Sembritzki, T              Telephone No. +49 89 2399-8626           </div>
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**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/GB2004/003204

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**Box No. I Basis of the opinion**

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1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:  
☐ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material:  
☐ in written format  
☐ in computer readable form
  - c. time of filing/furnishing:  
☐ contained in the international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/GB2004/003204

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**Box No. II Priority**

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1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

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**Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	1-21
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-21
Industrial applicability (IA)	Yes: Claims	1-21
	No: Claims	

2. Citations and explanations

see separate sheet

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**Box No. VII Certain defects in the international application**

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The following defects in the form or contents of the international application have been noted:

see separate sheet

Reference is made to the following documents:

D1: GB-A-2 324 484 (PALL CORP) 28 October 1998 (1998-10-28)

D2: EP-A-0 019 057 (KLOECKNER HUMBOLDT DEUTZ AG) 26 November 1980  
(1980-11-26)

D3: DE 199 51 312 A (REINZ DICHTUNG GMBH) 3 May 2001 (2001-05-03)

D4: US-A-1 735 298 (WILLIAM PFEFFER HENRY) 12 November 1929 (1929-11-12)

**Item V:**

**1. Novelty and inventive step**

- 1.1 Starting from the disclosure of D1 the applicants have realized, that a special parameter is linked to the efficiency of a special separation device, namely a device using a vortex generator formed by a helical vane (see claim 5). In the case of a vortex generator the centrifugal forces caused by the velocity of the fluid flow are important for the efficiency of the separation process, this, however, is not true for every kind of inertial separator, e.g. a separator comprising parallel plates. Accordingly, the effect obtained by adjusting the pressure drop is only achieved in the case of a vortex generator. It is therefore obvious that essential features are missing (Article 6 PCT).
- 1.2 In the present application examples are given how the pressure drop of each of the further stages can be adjusted. However, these techniques are already disclosed in document D1 (see D1, page 9, lines 1-5). The number of separation devices and the diameter of the flow passages can be varied between the different stages which has a direct influence on the pressure drop of each stage in relation the others. Although it is not specified in D1 that the pressure drop of the second stage is less than the one of the first stage it is clearly stated in D1 that the different stages are not identical so that that the pressure drop of the first stage is necessarily different to the one of the second stage if the above differences are present. The pressure drop of the second separation stage is therefore either higher or lower than the one of the first separation stage. It is therefore questionable whether the subject matter of claim 1 is not novel.
- 1.3 However, documents D2-D4 disclose inertial separators having vortex generators comprising two or more separation stages. It is for example explicitly stated in D4 (see D4, page 3, lines 66-84 as well as figures 1 and 2) that the flow conditions

must be different in the different stages in order to separate additional particles in the second and third stages. Again different diameters are mentioned but also the pitch of the helical vanes.

In the present case the flow of air is important since the velocity of the air flow provides for the driving force for the separation process. This air flow, however, requires a pressure difference within the device which is equal or higher than the sum of the pressure drops within the device. If the highest pressure drop would occur in the last stage, the flow rate within the first stages would be limited accordingly so that these stages would not work sufficiently. In this case the last stage would be the most effective stage and the stages before would provide only less additional separation capacity.

The only way of using the first stage effectively is to provide for a maximum flow rate within the first stage. This in turn requires that the outlet flow of the first stage is not disturbed, i.e. that the resistance for the flow downstream of the first stage is low. This leads automatically to the requirement that the pressure drop of each following separator stage must be less than the pressure drop of the separator stage upstream thereof. This is a logic conclusion and no surprising solution of a problem. Such a logic conclusion, however, comes within the scope of the customary practice followed by persons skilled in the art. Consequently, the subject-matter of claim 1 lacks an inventive step (Article 33(3) PCT).

- 1.4 The subject-matter of the other dependent claims seems to contain only features which are either known from the prior art and which a skilled person could easily combine without any inventive skill, or which are the result of a normal design procedure followed by a skilled person (Article 33(3) PCT).

## **2. Industrial application**

The industrial applicability is obvious.

## **Item VII**

1. According to the requirements of Rule 11.13(I) reference signs not appearing in the description shall not appear in the drawings, and vice versa. This requirement is not met in view of the reference signs "31" (vortex generator) and "22" (housing), which cannot be identified in the figures.  
Furthermore, the reference sign "14" used on page 5, line 6 for the inlet of a turbo



charger should read "40".

2. The independent claim is not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art being placed in the preamble (Rule 6.3(b)(I) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).